



CSCI 620 – Intro to Big Data Assignment #5 – Data Integration

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1) Implementing the Sources

The sources provided in the assignment were initialized and created in the *assignment5.py* script. Those sources are located under the *def create_sources* method.

2) Describing the Global Schemas

The global schema provided in the assignment were created in the *def create_global_schema* method in the *assignment5.py* script. Two versions of the schema were created, a non-materialized view and a materialized view.

3) Custom Queries over the Global Schema

In the assignment, two queries had to be created using the global schema. Those queries are in the *def queries* method of *assignment5.py*. The method performs the queries and prints out the first ten entries in the result.

4) Expanding the Custom Queries

Using the custom queries from the previous section of the assignment, new queries were made where the queries were expanding using the GAV mapping definitions over the sources. By running the *def expanded_queries* method, the newly expanded queries were performed and the execution time for each query (Materialized and Non-Materialized) were printed out.

```
It took 4.6328549 seconds to perform query one with the materialized views
It took 21.5073735 seconds to perform query one with the non-materialized views
It took 1.8193482000000003 seconds to perform query two with the materialized views
It took 14.8623519999999998 seconds to perform query two with the non-materialized views
```

5) Optimizing the Custom Queries

The queries in the previous section were optimized by eliminating redundant joins and sources. The optimized queries are executed in the *def optimized_queries* method. Below is a side-by-side comparison of the extended queries and then the optimized queries. We can see that the optimized did make quite the difference for both queries

Query #1 (Materialized):

```
1 SELECT aa.id, aa.name, aa.birthyear, COUNT(am.id)
2     FROM (SELECT *
3           FROM ComedyActor_Mat
4           UNION
5           SELECT *
6           FROM NonComedyActor_Mat) aa
7     JOIN (SELECT *
8           FROM ActedIn_Mat) ama
9           ON aa.id = ama.actorid
10    JOIN (SELECT *, 'Comedy' as genre
11          FROM ComedyMovie_Mat
12          UNION
13          (
14            SELECT DISTINCT ON (ncm.id) ncm.*, g.genre
15            FROM NonComedyMovie_Mat ncm
16            JOIN title_genre tg
17              ON ncm.id = tg.titleid
18            JOIN genre g
19              ON tg.genreid = g.id
20          )) am
21          ON ama.titleid = am.id
22    WHERE (
23          aa.deathyear is NULL AND
24          (am.startyear > 2000 AND am.startyear < 2005)
25        )
26    GROUP BY aa.id, aa.name, aa.birthyear
27    HAVING COUNT (am.id) >= 10
```

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1 SELECT aa.id, aa.name, aa.birthyear, COUNT(am.id)
2     FROM (SELECT *
3           FROM ComedyActor_Mat
4           UNION
5           SELECT *
6           FROM NonComedyActor_Mat) aa
7     JOIN (SELECT *
8           FROM ActedIn_Mat) ama
9           ON aa.id = ama.actorid
10    JOIN (SELECT *
11          FROM ComedyMovie_Mat
12          UNION
13          (
14            SELECT DISTINCT ON (ncm.id) ncm.*
15            FROM NonComedyMovie_Mat ncm
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Query #2 (Materialized):

```

1 SELECT aa.id, aa.name, aa.birthyear, aa.deathyear
2     FROM (SELECT *
3           FROM ComedyActor_Mat
4           UNION
5           SELECT *
6           FROM NonComedyActor_Mat) aa
7     JOIN (SELECT *
8           FROM ActedIn_Mat) ama
9           ON aa.id = ama.actorid
10    JOIN (SELECT *, 'Comedy' as genre
11          FROM ComedyMovie_Mat
12          UNION
13          (
14            SELECT DISTINCT ON (ncm.id) ncm.*, g.genre
15            FROM NonComedyMovie_Mat ncm
16            JOIN title_genre tg
17              ON ncm.id = tg.titleid
18            JOIN genre g
19              ON tg.genreid = g.id
20          )) am
21          ON ama.titleid = am.id
22    WHERE (
23      aa.name like 'Ja%' AND
24      am.genre != 'Comedy'
25    )

```

```

1 SELECT aa.id, aa.name, aa.birthyear, aa.deathyear
2     FROM (
3
4           SELECT *
5           FROM NonComedyActor_Mat) aa
6     JOIN (SELECT *
7           FROM ActedIn_Mat) ama
8           ON aa.id = ama.actorid
9     JOIN (
10      SELECT DISTINCT ON (ncm.id) ncm.*
11      FROM NonComedyMovie_Mat ncm
12    ) am
13
14    ON ama.titleid = am.id
15    WHERE (
16      aa.name like 'Ja%'
17    )

```

Timing:

```
It took 4.6328549 seconds to perform query one with the materialized views
It took 21.5073735 seconds to perform query one with the non-materialized views
It took 1.8193482000000003 seconds to perform query two with the materialized views
It took 14.862351999999998 seconds to perform query two with the non-materialized views
It took 0.820881 seconds to perform the optimized query one with the materialized views
It took 12.578244000000005 seconds to perform the optimized query one with the non-materialized views
It took 0.22226630000000114 seconds to perform the optimized query two with the materialized views
It took 12.408334499999995 seconds to perform the optimized query two with the non-materialized views
```